RESEARCH MILESTONES

Chemical and Biomolecular Engineering • Spring 2021

TRANSPORT



THE WILLIAM A. BROOKSHIRE DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING

Letter from the Chair

Dear Colleagues,

Greetings from Houston! I hope that our department's newsletter finds you and your families safe and well. Having just joined the University earlier this year in January, my first few months as the new Chair of the William A. Brookshire Department of Chemical and Biomolecular Engineering have been nothing short of inspiring.

The faculty of the department received several major research grants, published original research results in renowned scientific journals, and won prestigious national awards.

In this issue of Transport you will find news and highlights of faculty and student accomplishments over the past few months. If you would like to learn more about any of these items, or how to support a student or research project, and collaborate with our faculty, please do not hesitate to contact me.

Warm Regards,

Triantafillos J. (Lakis) Mountziaris

William A. Brookshire Department Chair and Professor William A. Brookshire Dept. of Chemical & Biomolecular Engineering University of Houston



٦ #36 BEST CHEMICAL FNGINFFRING PROGRAM IN THE U.S.

TOP 20 CHEMICAL DOCTORAL PROGRAM IN THE U.S. *Source: National Research Council

UH ChBE BY THE NUMBERS





IN DEPARTMENT

35M+ IN RESEARCH EXPENDITURES AT THE CULLEN COLLEGE OF ENGINEERING



0% of uh engineering UNDERGRADUATES ARE EMPLOYED WITHIN 1 YEAR OF GRADUATION



University of Houston | Cullen College of Engineering

MEHMET ORMAN, Ph.D.

ASSISTANT PROFESSOR OF CHEMICAL AND BIOMOLECULAR ENGINEERING AT THE UNIVERSITY OF HOUSTON CULLEN COLLEGE OF ENGINEERING



FROM THE NATIONAL SCIENCE FOUNDATION (NSF)



NEW NSF CAREER AWARD-WINNING RESEARCH WHY ANTIBIOTIC-RESISTANT CELLS PERSIST

Mehmet Orman, assistant professor of chemical and biomolecular engineering at the University of Houston Cullen College of Engineering, has received a Faculty Early Career Development (CAREER) Award from the National Science Foundation. NSF CAREER awards are granted to highly promising junior faculty members who exemplify the role of teacher-scholars through *"outstanding research, excellent education and the integration of education and research."*

The CAREER award will provide Orman with \$500,000 to study so-called persister cells - those that go dormant and then become tolerant to extraordinary levels of antibiotics. Orman's goal is to figure out just what makes these persister cells tick, by identifying common mechanisms they exhibit from a variety of bacterial strains. Interestingly, persister cells go in and out of their state of hibernation, and Orman will take a close look at that.

University of Houston | Cullen College of Engineering

JEFFREY RIMER, PH.D.

ABRAHAM E. DUKLER ENDOWED CHAIR PROFESSOR IN THE WILLIAM A. BROOKSHIRE DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING

----- ELECTED TO THE ------

NAI SENIOR MEMBER CLASS OF **2021**





Dr. Jeffrey Rimer, Abraham E. Dukler Endowed Chair Professor in the William A. Brookshire Department of Chemical and Biomolecular Engineering, was elected to the NAI Senior Member Class of 2021. He is among 61 academic inventors from around the country chosen for the prestigious honor for their remarkable innovation-producing technologies and growing success in patents, licensing and commercialization.

Professor Rimer is known for his expertise in the processes behind crystal growth and formation, which impacts everything from drug development and the production of chemicals and fuels to pathological diseases such as kidney stones and malaria. *"I am extremely honored to receive senior membership in the NAI,"* Rimer said. *"Being affiliated with this prestigious organization will afford new opportunities for innovation and expanded research activities by engaging with a global network of highly accomplished inventors."*

University of Houston | Cullen College of Engineering

DEPARTMENT UPDATES

MOUNTZIARIS JOINS UH AS **WILLIAM A. BROOKSHIRE** DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING CHAIR



The University of Houston's Cullen College of Engineering is proud to welcome **Dr. Triantafillos J. (Lakis) Mountziaris** as the inaugural William A. Brookshire Professor and Department Chair of the William A. Brookshire Department of Chemical and Biomolecular Engineering.

Mountziaris has more than 30 years of experience as an academic leader and faculty member at UMass-Amherst and the University at Buffalo - the State University of New York, and as a program director at the National Science Foundation. He has supervised 24 doctoral and 30 master's advisees and supported their research with grants from federal and industrial sponsors. He

has co-authored more than 80 research papers, edited two books, and is co-inventor on three U.S. patents.

He is the recipient of several honors and awards, including the Norman Hackerman Award of the Electrochemical Society, the Chancellor's Award for Excellence in Teaching of the State University of New York, the Chancellor's Exceptional Merit Award of UMass-Amherst, numerous keynote and invited lectures, and honorary visiting professorships at ETH-Zürich and Princeton University. He is a Fellow of the American Association for the Advancement of Science and the American Institute of Chemical Engineers.



UH'S HENDERSON EARNS NATIONAL EDUCATIONAL LEADERSHIP AWARD

A professor at the University of Houston's Cullen College of Engineering has earned another national distinction, as his work in providing unique learning experiences for students was recognized by the Career Communications Group's U.S. Black Engineer and Information Technology magazine, and the Council of Engineering Deans of the Historically Black Colleges and Universities.

Dr. Jerrod A. Henderson, the director of the Program for Mastery in Engineering Studies and an instructional associate professor in the William A. Brookshire Department of Chemical and Biomolecular Engineering, earned the Black Engineer of the Year (BEYA) Educational Leadership – College-Level Promotion of Education Award. He was nominated for the honor by **Dr. Michael P. Harold**, the chairman of the department at the time. **‡**

UNIVERSITY OF HOUSTON **PARTNERS** WITH AURAVAX THERAPEUTICS ON COVID-19 VACCINE

11 . 10

The University of Houston has entered into an exclusive license option agreement with AuraVax Therapeutics Inc., a Houston, TX based biotech company developing novel vaccines to help patients defeat debilitating respiratory diseases such as COVID-19. Under terms of the agreement, AuraVax has the option to exclusively license a new intranasal COVID-19 vaccine technology developed by **Dr. Navin Varadarajan**, M.D. Anderson Professor of Chemical and Biomolecular Engineering. Varadarajan is also a co-founder of AuraVax.

The vaccine is a nasal inhalant, like FluMist.

"We plan to stop COVID-19, a respiratory virus, at its point of entry — the nasal cavity — and we believe our intranasal platform is a differentiated approach that will lead to a vaccine with increased efficacy to create sustained immunity to COVID-19," Varadarajan said. 🌣





NEW RESEARCH GRANTS





GRABOW NETS ANOTHER \$2M FOR RESEARCH PROJECTS ON SMALL REACTORS, CATALYSTS

A Cullen College of Engineering professor will be furthering his research into developing small, modular reactor systems and tuning the properties of catalysts after receiving a pair of grants expected to total more than \$2 million in funding. **Dr. Lars C. Grabow**, the Dan Luss Professor in the Cullen College of Engineering's William A. Brookshire Department of Chemical and Biomolecular Engineering, is the primary investigator for "Resilient Ammoxidation of Small Hydrocarbons (R-ASH) Using Forced Dynamic Operation for Maximal Flexibility." While the exact budget is still being negotiated, roughly \$1.3 million of the \$3.6 million project will fund work at UH. Other team members are at the Idaho National Laboratory, the University of Virginia, the Pacific Northwest National Laboratory, and KX2 Development. The goal is to increase options and safety when it comes to dealing with sometimes volatile and explosive chemicals.

NEW PAPER FROM VEKILOV RESEARCH GROUP CHANGES FUNDAMENTAL THINKING ON CRYSTAL FORMATION

A new paper from the **Vekilov Research Group** at the University of Houston's Cullen College of Engineering is shedding light on how crystals form, and in the process, overturning a belief held for more than a century. Dr. Peter G. Vekilov, the John and Rebecca Moores Professor in the William A. Brookshire Department of Department of Chemical and Biomolecular Engineering, is lead author for "Olanzapine crystal symmetry originates in preformed centrosymmetric solute dimers," which was published in late September by Nature Chemistry. It was also featured on Nature Chemistry's social media account in October Additional authors include UH doctoral student Lakshmanji Verma and Dr. Jeremy C. Palmer of the William A. Brookshire Department of Chemical and Biomolecular Engineering; and Monika Warzecha, Blair F. Johnston and Alastair J. Florence of EPSRC CMAC Future Manufacturing Research Hub at the Strathclyde Institute of Pharmacy and Biomedical Sciences Technology and Innovation Centre in Glasgow, United Kingdom. Johnston is also with the National Physical Laboratory in Teddington in the United Kingdom. 🍄





CHAKRABARTI EARNS **ARTISTIC** HONOR FOR CRYSTAL ART

The artistic work of a scientist at the Cullen College of Engineering has been recognized with a third place finish in the British Association for Crystal Growth's 2020 Crystal in Art competition.

Rajshree Chakrabarti, a graduate student in the William A. Brookshire Department of Chemical and Biomolecular Engineering, was honored for her submission, "Colour of Life," which showcases Protoporphyrin IX. Her adviser is Dr. Peter Vekilov, the John and Rebecca Moores Professor of Chemical and Biomolecular Engineering and Chemistry.

STUDENT

SUCCESS



THE AMERICAN SOCIETY OF INDIAN ENGINEERS AND ARCHITECTS (ASIE) HAS AWARDED FIVE SCHOLAR-SHIPS FOR 2020 TO STUDENTS ATTENDING THE UH CULLEN COLLEGE OF ENGINEERING:

ASIE SCHOLARSHIP WINNER 2020 Ankur Agrawal — Ph.D. in Chemical and Biomolecular Engineering



RAVI JAISINGHANI SCHOLARSHIP WINNER 2020 Sreyashi Ghosh — Ph.D. in Chemical Engineering

The University of Houston Cullen College of Engineering

The University of Houston Cullen College of Engineering addresses key challenges in energy, healthcare, infrastructure and the environment by conducting cutting-edge research and graduating hundreds of worldclass engineers each year. With research expenditures topping \$35 million and increasing each year, we continue to follow our tradition of excellence in spearheading research that has a real, direct impact in the Houston region and beyond.



UNIVERSITY of **HOUSTON** ENGINEERING

UH Cullen College of Engineering Department of Chemical & Biomolecular Engineering Engineering Building 1 4726 Calhoun Road, Suite S222 Houston, Texas 77204-4004

Research A MILESTONES